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# Principle and performance of the transverse oscillation vector velocity technique in medical ultrasound

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Medical ultrasound systems measure the blood velocity by tracking the blood cells motion along the ultrasound field. The is done by pulsing in the same direction a number of times and then find e.q. the shift in phase between consecutive pulses. Properly normalized this is directly proportional to the axial blood velocity. A major drawback is that only the axial velocity component is found. Often the lateral component is most important as blood vessels run parallel to the skin surface. The talk presents the transverse oscillation approach, which also can find the lateral velocity component by using a double oscillating field. A special estimator is then used for finding both the axial and lateral velocity component, so that both magnitude and phase can be calculated. The method for generating double oscillating ultrasound fields and the special estimator are described and its performance revealed for a flow rig setup. Several examples from clinical use of the approach are shown. From these it is seen that both velocity magnitude and angle varies temporally and spatially across the cardiac cycle, and it is, thus, important to estimate both continuously over the image region and time.